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Taxonomic assessment of some pyronemataceous fungi from China

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Abstract — Four new species of the *Pyronemataceae*, *Aleuria medogensis*, *Cheilymenia sinensis*, *Otidea bicolor,* and *Scutellinia setosiopsis*, are described and illustrated. A name change is required for the previously published *Pulvinula guizhouensis*. *Psilopezia nummularialis* and *Smardaea verrucispora* are reported for the first time from China. Comments are made on nine other previously recorded taxa, *Cheilymenia vitellina*, *Humaria semi-immersa*, *Lamprospora haemastigma*, *L. wisconsinensis*, *Otidea abietina*, *Psilopezia deligata*, *Pulvinula laeterubra*, *Trichophaea bullata,* and *T. pseudogregaria*, all of which should be excluded from the Chinese fungus flora.

Key words — *Aleuria*, *Cheilymenia*, *Otidea*, *Scutellinia*, new Chinese records, corrections

Introduction

Early records of the pyronemataceous fungi from China date from Teng's first report on discomycetes (Teng 1934), in which 5 species of the genera *Pyronema* Carus, *Pulvinula* Boud. [as *Psilopezia* Berk.], *Scutellinia* (Cooke) Lambotte [as "*Patella* Weber"], and *Cheilymenia* Boud. [as *Patella*] were recorded. Species of *Lamprospora* De Not., *Melastiza* Boud. and *Sphaerosporella* (Svrček) Svrček & Kubička [as "*Sphaerospora* Sacc."] were later added, and a total of 12 species were known from the country five years later (Teng 1939). Teng's major contribution to taxonomy of the group was summarized in the eminent work "Fungi of China" (Teng 1963, 1996), where 25 taxa belonging to 11 genera were included with diagnostic features, habit, and the known distribution in the country for each species, and in which taxa of *Aleuria* Fuckel, *Geopora* Harkn. [as "*Sepultaria* (Cooke) Lambotte"], *Geopyxis* (Pers.) Sacc., and *Otidea* (Pers.) Bonord. were further recognized. Information about *Pyronemataceae* in China was updated in "Sylloge Fungorum Sinicorum" (Tai 1979), including 40

species of 14 genera with related references, distribution, and habit. Beginning in the 1980's, studies on this fungal group have flourished. Regional floras and detailed treatments of some genera in this family have been published more recently, significantly extending our knowledge of species diversity in China (Wang & Zang 1983; Korf & Zhuang 1984, 1985, 1987; Liu & Cao 1987; Zhuang & Korf 1989; Cao et al. 1990a,b; Zhang 1990; Liu 1991; Zhuang 1994, 2001, 2005, 2006, 2009; Liu & Peng 1996; Zang 1996; Wang 1998; Zhuang & Wang 1998a,b; Yu et al. 2000; Wang & Pei 2001; Zhuang & Yang 2008). Meanwhile, efforts are underway to publish a volume on *Pyronemataceae* as part of the Flora Fungorum Sinicorum. Taxonomic and nomenclatural problems have been encountered and solved, and progress has been achieved. More than 120 taxa belonging 35 genera are recorded thus far. In this study, four species in *Aleuria*, *Cheilymenia*, *Otidea* and *Scutellinia* are described as new to science, attention is called to the requirement for the name change of a previously published taxon, two species are reported for the first time from China, and comments are made on nine previously recorded taxa that should be excluded from the Chinese fungus flora.

Material and methods

Historical specimens of the pyronemataceous fungi from China on deposit in the Mycological Herbarium, Chinese Academy of Sciences (HMAS) and Herbarium of Cryptogams, Kunming Institute of Botany, Chinese Academy of Sciences (HKAS) were re-examined. Recent collections of the family made in 1988–2009 from various areas of China were also identified. Apothecia were rehydrated and sectioned on a freezing microtome (YD-1508A, Yidi Medical Instrument Co., Jinhua, China) at a thickness of 20–25 µm. Measurements were taken from sections mounted in cotton blue-lactophenol solution and from squash mounts in the same medium. For SEM study of the spore surface morphology, a piece of hymenium was cut and attached directly to a stub. The materials were coated with gold-palladium and observed with SEM (FEI Quanta 200). Photographs were taken with a digital camera (Canon G5, Tokyo, Japan) connected to a Zeiss Axioskop 2 plus microscope.

Results and discussion

New species

Aleuria medogensis W.Y. Zhuang, **sp. nov.** Figs. 1A–B, 3A, 5A

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Apotheciis in siccitate 7–20 mm diam.; ascis J–, 230–267 × 11–13 µm; ascosporis ellipsoideis vel oblongo-ellipsoideis, 15–18(–19) × 7.5–9 µm, superficie hemisphaerice tuberculatis, 0.7–1.8 µm diam.

Holotype: CHINA. Tibet, Medog, on duff and soil, 20 Aug 1982, X.L. Mao 135, HMAS 53470 (previously filed as *Melastiza chateri*).

Etymology: Referring to the place where the fungus was first collected.

Dried apothecia discoid, sessile, 7–20 mm diameter, hymenium surface orange-brown to brown, receptacle surface concolorous, nearly smooth; short cell protrusions arising from the outermost cells of the ectal excipulum, subcylindrical, hyaline, smooth-walled, very short, 15–50 µm long and 5–7.5 µm wide; ectal excipulum of textura angularis, 30–50 µm thick, cells isodiametric or subellipsoid, hyaline, thin-walled, 8–31 × 7–24 µm or 9–20 µm diameter; medullary excipulum of textura intricata, 280–520 µm thick or thicker, hyphae hyaline, thin-walled, 2–4 µm wide; subhymenium ca 20 µm thick; hymenium 260–280 µm thick; asci operculate, 8-spored, subcylindrical, J– in Melzer's reagent with or without KOH pretreatment, 230–267 × 11–13 µm; ascospores ellipsoid to oblong-ellipsoid, hyaline, unicellular, with separate warts on surface, eguttulate, uniseriate, 15–18(–19) × 7.5–9 µm, spore markings hemispherical, solitary, occasionally 2–3 interconnected, densely distributed, 0.7–1.8 µm wide and 0.5–0.8(–1) µm high; paraphyses filiform, very slightly enlarged at apex, 3–5 µm wide at apex, 2 µm wide below.

Notes: Among the known species of *Aleuria* (Rifai 1968, Thind & Waraitch 1971, Moravec 1972, 1994; Reid et al. 1981, Häffner 1993), *A. tectipus* (Spooner) W.Y. Zhuang & Korf is the most similar to *Aleuria medogensis* in width of asci and size of ascospores as well as presence of separate warts on the spore surface. *A. tectipus* differs in paler apothecia which are much smaller (up to 6.5 mm diam. when fresh), with shorter asci (160–180 × 11–13 µm), and uni- to bi-guttulate ascospores with much larger spore ornamentations (3–4 µm diam. and 1.5–3 µm high) (Reid et al. 1981). *Melastiza boudieri* (Höhn.) Le Gal is somewhat similar to *A. medogensis* in ascospore length and the warted spore surface, but it differs significantly in the brownish and longer hairs (70–250 × 9–16 µm), wider ascospores [(15–)16.5–19.5(–21) × 9.2–12.5(–15) µm], spore markings connected by fine crests and larger hemispherical markings (1.5–3(–4.5) µm diam.), and much smaller apothecia only 3–7 mm diam. when fresh (Moravec 1994).

Cheilymenia sinensis W.Y. Zhuang, **sp. nov.** Figs. 1C–E, 3B, 5B, 6A

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Apotheciis discoideis, 1.5–4 mm diam., hymeniis luteis vel pallide persicino-flavis, receptaculis hirsutis; ascis J–, 167–216 × 10–12.5 µm; ascosporis ellipsoideis, eguttulatis, 14–16.5 × 8–10.5 µm.

Holotype: China. Sichuan, Daocheng, 3900 m, on yak dung, 4 Jul 1998, Z. Wang 34, HMAS 75942 (previously filed as *Cheilymenia coprinaria*).

Etymology: Referring to the country where the fungus was first collected.

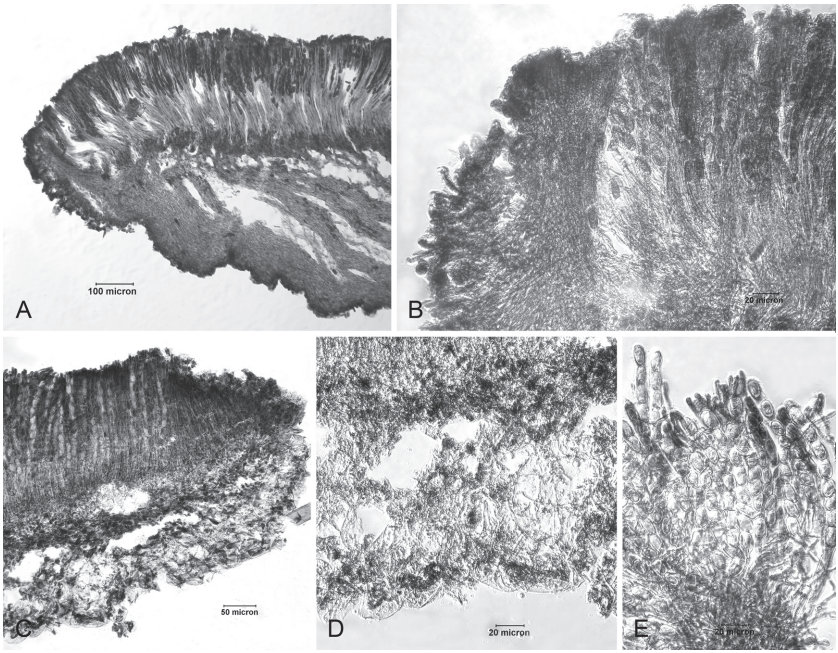

Fig. 1. Morphology of *Aleuria medogensis* and *Cheilymenia sinensis*. A–B. *Aleuria medogensis* (HMAS 53470). A. Anatomy of apothecium. B. Structure of apothecium at margin. C–E. *Cheilymenia sinensis* (HMAS 188412). C. Anatomy of apothecium. D. Structure of ectal excipulum. E. Portion of hymenium.

Apothecia discoid, sessile, 1.5–4 mm in diameter, hymenium surface orange-yellow to light pinkish yellow, receptacle lighter than hymenium, surface covered with setae arising from inner cells of excipulum, brown to light brown, with 1–2 rootlets at base, mostly with 4–9 septa, 180–500 × 18–33, walls 2–5 μm thick; ectal excipulum of textura angularis, 50–165 μm thick, cells nearly isodiametric, walls of outermost cells somewhat brownish and of inner ones subhyaline, 23–51 × 12–30 μm or 13–55 μm diameter if isodiametric; medullary excipulum of textura intricata, 38–115 μm thick, hyphae hyaline, thin-walled, 2.5–9 μm wide; subhymenium not clearly distinguishable, 0–20 μm thick; hymenium 185–203 μm thick; asci operculate, 8-spored, subcylindrical, J– in Melzer's reagent with or without KOH pretreatment, 167–216 × 10–12.5 μm; ascospores rectangular-ellipsoid, broadly ellipsoid to ellipsoid, with ends blunt, eguttulate, with contents refractive, sometimes with a de Bary bubble, surface very minutely granulate, 14–16.5 × 8–10.5 μm; paraphyses filiform, slightly wider at apex, 3.5–4.5 μm wide at apex and 2 μm wide below.

Paratypes: China. Qinghai, Ledu, 2800 m, on cow dung, 11 Aug 2004, W. Y. Zhuang & C. Y. Liu 5259, HMAS 188412; Qinghai, Datong, alt. 3000 m, on cow dung, 17 Aug 2004, W. Y. Zhuang 5388-1, HMAS 188413.

Notes: Among the known species of *Cheilymenia* (Moravec 2005), *C. coprinaria* (Cooke) Boud. resembles the new species in length of ascospores, length of asci, and color of hymenium, but it produces somewhat larger apothecia [(2–)3–7(–10) mm diam.], much longer hairs (150–800(–1050) × 15–35(–45) µm], and a base that is bifurcate or (usually) multifurcate rather than having 1–2 rootlets. It also has wider asci (135–23 × 12–15 µm), narrower ascospores [(12.5–)13.5–17(–19) × (6.8–)7.5–9.2(–10.8) µm], densely distributed spore ornamentations, and obviously enlarged paraphysis apices (4.5–7.5(–9) µm wide).

Cheilymenia dennisii J. Moravec is somewhat similar to *C. sinensis* in size of apothecia, shape of ascospores, and size of setae, but differs in having much wider asci (170–240 × (13.5–)15–18 µm), larger spores [(14.5–)15.5–19.5(–21) × (8–)9.5–12.2(–13.5) µm] with higher and denser spore ornamentations, as well as wider paraphyses of a different shape and 6–10(–12) µm wide at apex (Moravec 2005). The ascospore surface morphology (SEM) of *Cheilymenia sinensis* is also similar to that of *C. magnipila* J. Moravec, but the two species differ significantly in many other aspects (Moravec 2005).

Otidea bicolor W.Y. Zhuang & Zhu L. Yang, **sp. nov.** Figs. 2A–C, 4, 5C

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Apotheciis cupulatis, fissilibus, brevistipitatis, hymeniis leviter aurantiacis vel luteis, receptaculis leviter violaceis-brunneis; ascis J–, 140–182 × 9–10.5 µm; ascosporis ellipsoideis, biguttulatis, 10–12 × 5.5–6 µm.

Holotype: CHINA. Yunnan, Kunming, Heilongtan Park, on the ground among fallen conifer needles in mixed conifer and broadleaf tree forest, 16 Aug 2008, Z. L. Yang 5156, HKAS 54453 **holotype**; HMAS 188415 (isotype).

Etymology: Referring to significant color difference between hymenium and receptacle surface.

Apothecia deep-cupulate with a split down to the base, short-stipitate, truncate, 10–22 mm wide when dry, hymenium surface light dirty orange to beige when fresh, receptacle surface light vinaceous brown or brown with a purplish tint when fresh, nearly smooth to minutely granulate; ectal excipulum of texture angularis mixed with textura globulosa, with small pustules on the surface and a few very short hyphal protrusions, 35–60 µm thick (excluding pustules), cells angular to subglobose, subhyaline, thin-walled, 8–23 µm diameter or 15–23 × 10–18 µm, pustules 20–60 µm high, cells in pustules commonly isodiametric, 8–18 µm diameter; medullary excipulum of textura intricata, 300–1400 µm thick, hyphae hyaline, thin-walled, 3.5–12.5 µm wide; subhymenium not clearly distinguishable; hymenium 150–160 µm thick; asci subcylindrical, operculate,

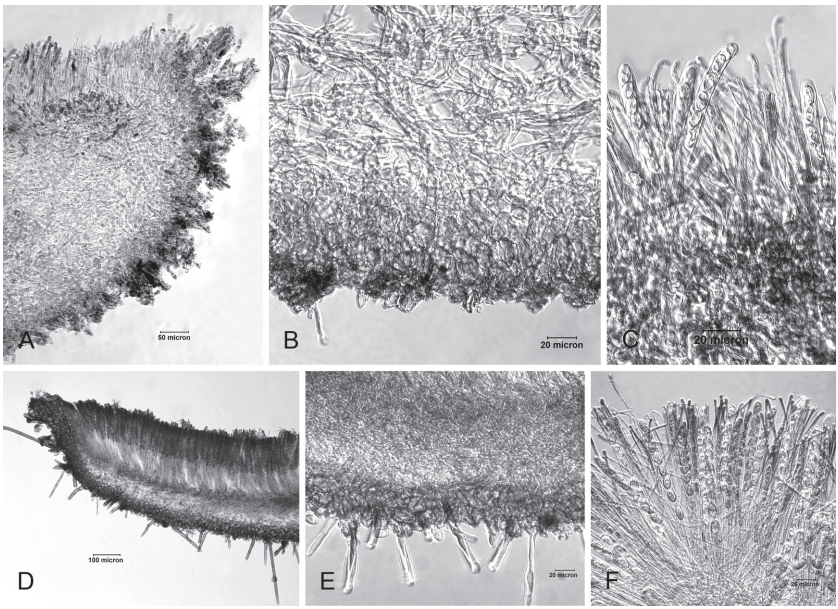

Fig. 2. Morphology of *Otidea bicolor* and *Scutellinia setosiopsis*. A–C. *Otidea bicolor* (HKAS 54453). A. Anatomy of apothecium near margin. B. Structure of excipulum. C. Asci and paraphysis apices. D–F. *Scutellinia setosiopsis* (HMAS 76074). D. Anatomy of apothecium. E. Structure of excipulum. F. Asci and paraphyses.

8-spored, J– in Melzer's reagent with or without KOH pretreatment, 140–182 × 9–10.5 µm; ascospores ellipsoid, smooth-walled, hyaline, unicellular, biguttulate, uniseriate, 10–12 × 5.5–6 µm; paraphyses filiform, curved or circinate at apex, septate, 2.5–3.5 µm wide at apex, 1.8–2.5 µm below.

Notes: This species is characterized by the combination of deep-cupulate apothecia with a split down to the base, significant color difference between the light dirty orange to beige hymenium surface and light vinaceous brown receptacle surface, which looks minutely granulate, and smooth-walled, 10–12 × 5.5–6 µm ascospores.

Among the known species of the genus, *Otidea sinensis* J.Z. Cao & L. Fan is possibly the closest and most similar species to *O. bicolor*. Both species show significant color contrast between the surface of the hymenium and of the receptacle and the size of asci and of ascospores are similar; they differ in apothecial color and shape and excipular structure. The former has broad-spathulate apothecia with a maize yellow disc and amber brown receptacle

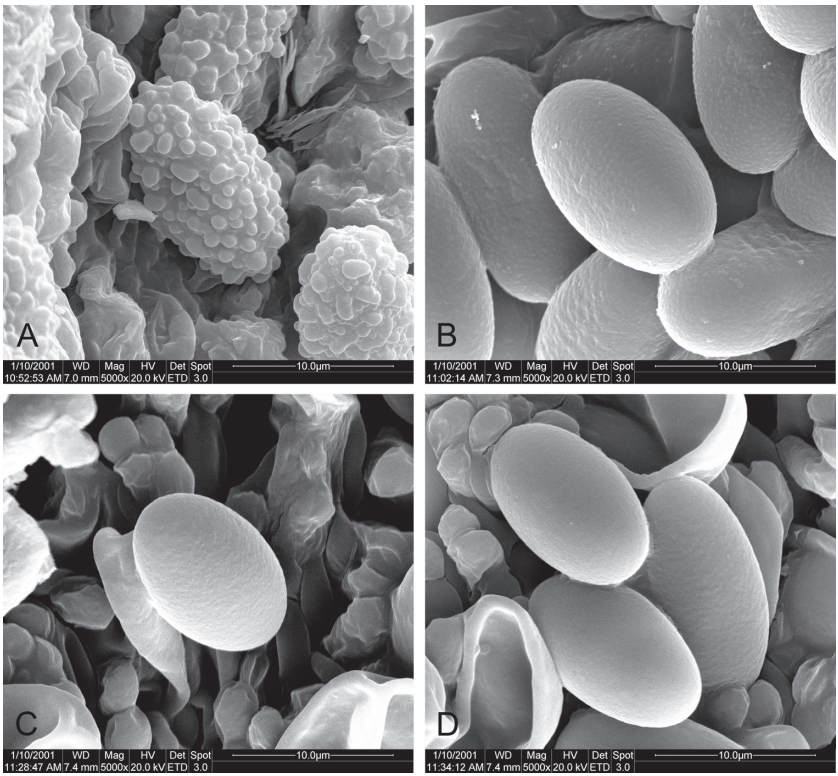

Fig. 3. SEM of ascospore surface morphology. A. *Aleuria medogensis*, from HMAS 53470. B. *Cheilymenia sinensis*, from HMAS 188412. C–D. *Scutellinia setosiopsis*, from HMAS 76074.

surface in fresh condition, cells of pustules commonly elongate and arranged in chains like those of *Helvella* species with a villose receptacle surface, and wider paraphyses (Cao et al. 1990a).

When apothecial shape and color contrast between disc and receptacle surface are considered, *Otidea grandis* (Pers.) Rehm is also similar, but differs obviously in the yellow hymenium and grayish brown to yellowish gray receptacle, ascospores that are elongate-ellipsoid to fusoid-ellipsoid, 14–17 × 6–7 µm, and have irregular crests on the spore surface (Boudier 1905–1911, Kanouse 1949, Liu & Zhuang 2006). *Otidea yunnanensis* (B. Liu & J.Z. Cao) W.Y. Zhuang & C.Y. Liu has a similar disc color, but possesses a spathulate apothecium with a long, tough, warm brown stalk and a brown to grayish brown receptacle surface lacking any purplish tint and larger ascospores 16.5–20 × 7.6–10 µm with spine-like ornamentations (Liu & Cao 1987, Liu & Zhuang 2006).

Fig. 4. Apothecia of *Otidea bicolor* on natural substrate, from HKAS 54453.

Scutellinia setosiopsis W.Y. Zhuang, **sp. nov.** Figs. 2D–F, 3C–D, 5D, 6B

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Apotheciis discoideis, sessilibus, 3–5 mm in diam., hymeniis vitellinis, receptaculis hirsutis; pili setosis, brunneis, 55–820 × 11–25 µm; ascis J–, 218–274 × 10–12.7 µm; ascosporis ellipsoideis, 1(–2)-guttulatis, (13–)14–17.5 × 7.5–9.5(–10) µm.

Holotype: CHINA. Beijing, Dongling Mountains, on rotten wood, 4 Sept 1999, Z. Wang 320, HMAS 76074 (previously filed as *Cheilymenia* sp.).

Etymology: Referring to the similar spore surface morphology to *Scutellinia setosa*.

Apothecia discoid, sessile, 3–5 mm in diameter, margin thin and distinct, hymenium surface egg-yellow when fresh and dirty orange to brown when dry, receptacle surface covered by brown setae arising from inner cells of excipulum or from brown and thick-walled outer cells, with 0–1–2(–3) rootlets, brown, 2- to multi-septate, mostly 55–820 µm long, 11–25 µm wide, walls 2–4.5 µm thick, with very short and light brown hairs with a blunt apex that are scattered at the apothecial base; ectal excipulum of textura angularis, 60–75 µm thick, cells angular to subglobose, subhyaline to light brown, 10–25 µm diameter or 18–38 × 9–33 µm, walls 1–1.3 µm thick; medullary excipulum of textura intricata, 50–100 µm thick, hyphae subhyaline, thin-walled, 2.5–7.5 µm wide; subhymenium not distinguishable; hymenium 240–255 µm thick; asci

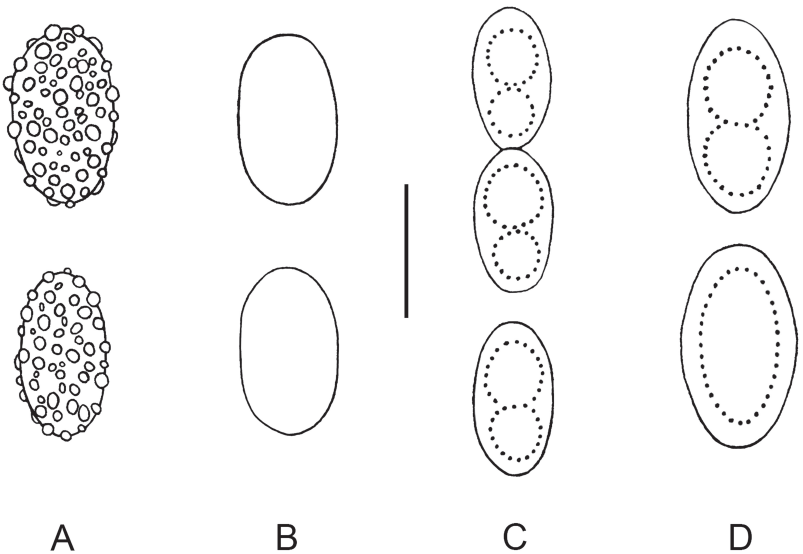

Fig. 5. Ascospore morphology.
A. *Aleuria medogensis*, from HMAS 53470. B. *Cheilymenia sinensis*, from HMAS 188412. C. *Otidea bicolor*, from HKAS 54453. D. *Scutellinia setosiopsis*, from HMAS 76074. Scale bar = 10 μm.

subcylindrical, operculate, 8-spored, J– in Melzer's reagent with or without KOH pretreatment, 218–274 × 10–12.7 μm; ascospores ellipsoid, surface nearly smooth, hyaline, unicellular, with 1–2 guttules, uniseriate, (13–)14–17.5 × 7.5–9.5(–10) μm; paraphyses filiform, very slightly enlarged at apex, 2.5–3.8 μm wide at apex, 2 μm wide below.

Notes: Among taxa of *Scutellinia* possessing nearly smooth-walled ascospores under the light microscope, *S. setosa* (Nees) Kuntze and *S. setosissima* Le Gal (Schumacher 1990) are similar to *S. setosiopsis*. *Scutellinia setosa* differs from the new species in smaller apothecia (1–2.5 mm diam.) with reddish to red brown hymenium, longer and wider hairs (450–880 × 15–30 μm), larger ectal excipular cells (20–60 μm diam.), and larger ascospores (17.8–20.6 × 10.2–12.4 μm). *Scutellinia setosissima* is characterized by a hymenium surface that is ochraceous white when dry, longer and wider setae (450–1250 × 25–35 μm), wider asci (195–240 × 12.8–16.5 μm), much larger ascospores (17.8–23.5 × 9.8–13.2 μm), and enlarged paraphysis apices 6–10 μm wide. The new species is characterized by the combination of yellow hymenium, narrow hairs 11–25 μm wide, and nearly smooth-walled ascospores (13–)14–17.5 × 7.5–9.5(–10) μm, which make it distinctive in the genus.

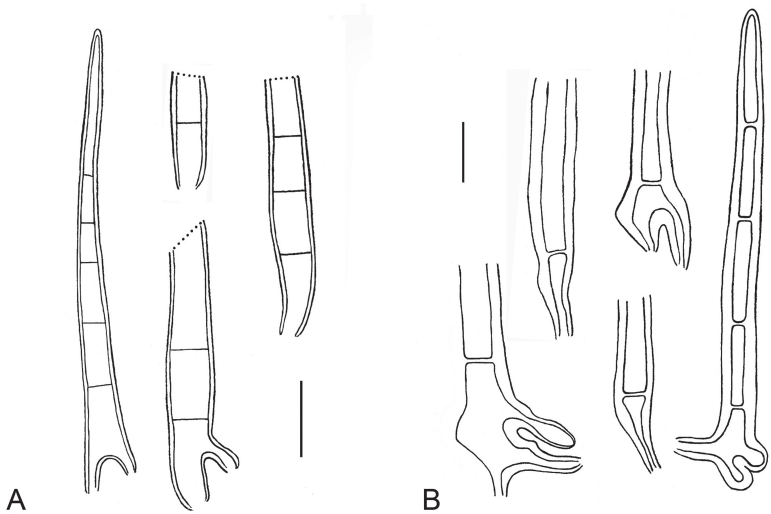

Fig. 6. Hair morphology.
A. *Cheilymenia sinensis*, from HMAS 188412. B. *Scutellinia setosiopsis*, from HMAS 76074. Scale bars: A = 50 μm, B = 20 μm.

Name change for a previously published taxon

Pulvinula guizhouensis M.H. Liu, Acta Mycol. Sinica 10: 187, 1991.
= ***Pulvinula globifera*** (Berk. & M.A. Curtis) Le Gal, Prodr. Flore Mycol. Madagascar 4: 94, 1953.

Specimen examined: CHINA. Guizhou, Suiyang, alt. 1450 m, on sandy soil in broadleaf forest, 11 Aug 1987, M. H. Liu 1017 (holotype of *Pulvinula guizhouensis*); HMAS 97546 (isotype).

Other specimens examined: CHINA. Yunnan, Jizushan, on the ground, 12 Sept 1938, H. S. Yao, HMAS 17131 (previously filed as *Lamprospora wisconsinensis*); Yunnan, Kunming, on the ground, 13 Oct 1938, C. C. Cheo, HMAS 17132 (previously filed as *Lamprospora wisconsinensis*); Beijing, Qinghuayuan, on the ground, L. Shi, May 1935, HMAS 17133 (previously filed as *Lamprospora* sp.).

Notes: Re-examination of the holotype of *Pulvinula guizhouensis* (LMH 1017) and consultation of the original description of the fungus (Liu 1991) indicate that it is identical to *P. globifera* as described by Rifai (1968). The latter name has the priority and is the correct name for the fungus.

New records for China

Psilopezia nummularialis Pfister & Cand., Mycotaxon 13: 367, 1981.

Specimens examined: CHINA. China, Hubei, Wufeng County, Houhe Nature Reserve, alt. 800 m, on rotten bark, 12 Sept 2004, W. Y. Zhuang & C. Y. Liu 5528, 5530, 5531, HMAS 173269, 173270, 173271.

Smardaea verrucispora (Donadini & Monier) Benkert, Zeit. Mykol. 71: 148, 2005.

Specimen examined: CHINA. China, Yunnan, Kunming, Xishan, on the ground, 14 Jul 1938, C. C. Cheo, HMAS 17134 (previously filed as *Lamprospora* sp.).

Previously recorded species that should be excluded from the Chinese fungus flora

Cheilymenia vitellina (Pers.) Dennis, British Cup-fungi and Their Allies p. 27, 1960.

Chinese record: Zhuang, Fungi of Northwestern China, p. 104, 2005.

Notes: The Chinese record of *Cheilymenia vitellina* was based on a single collection (HMAS 83254) from northwestern China labelled as *C. vitellina* on deposit in the Mycological Herbarium, Institute of Microbiology, Chinese Academy of Sciences (Zhuang 2005). Re-examination of the material reveals that it possesses all the features of the genus *Tricharina* Eckblad (Yang & Korf 1985), such as apothecia cupulate, semi-immersed in soil, broadly attached to substrate, hairs arising from surface cells of ectal excipulum and not rooting at base, and 8 ascospores almost completely filling the ascus. The previous Chinese record of *C. vitellina* is based on a misidentification.

Humaria semi-immersa (P. Karst.) Sacc., Syll. Fung. 8: 143, 1889.

≡ *Sepultariella semi-immersa* (P. Karst.) Kutorga, Lietuvos Grybai (Vilnius) 3(5): 188, 2000, nom. provis.

Chinese record: Tai, Sylloge Fungorum Sinicorum, p. 159, 1979.

Notes: The true *Humaria semi-immersa* is no longer considered to be a member of *Humaria* Fuckel in the current sense (Korf 1973) and has been transferred provisionally to a new genus *Sepultariella* Kutorga nom. provis. (Kutorga 2000). Dr. E. Kutorga kindly provided the following information based on his examination of the type material of this fungus: this species is affiliated with a *Peziza* (*Leucoscypha*) species or related fungi and its ascospores are (1–)2-guttulate (Kutorga pers commun).

The Chinese record of *Humaria semi-immersa* was based on the collections so labelled and deposited in HMAS (Tai 1979). Re-examinations of all specimens filed under this name (HMAS 12163, 17269, 33723) show that they belong to the genera *Geopora* and *Cheilymenia*. The previous record of *H. semi-immersa* is based on misidentifications.

Lamprospora haemastigma (Hedw.) Seaver, Mycologia 6: 17, 1914.

Chinese record: Teng, Fungi of China, p. 287, 1963.

Notes: The taxonomic viewpoint on *Pulvinula* by Pfister (1976) is followed here, and *Pulvinula haemastigma* is treated as a nomen confusum.

Teng (1963) and Tai (1979) obviously accepted the species concept of *Lamprospora haemastigma* by Seaver (1928), who treated *Lamprospora* in a very broad sense. Judging from the description of "*L. haematostigma*" from Gansu Province by Teng (1963, 1996), the fungus possesses all the features of *Pulvinula* Boud. Re-examination of the only material on deposit in HMAS filed under "*Lamprospora haematostigma*" (HMAS 08974 collected and identified by S.C. Teng) indicates that the correct name for the fungus is *Pulvinula carbonaria* (Fuckel) Boud., which is recorded here for the first time from the mainland of China.

Lamprospora wisconsinensis Seaver, North American Cup-fungi (Operculates) p. 69, 1928.

Chinese record: Tai, Sylloge Fungorum Sinicorum p. 181, 1979.

Notes: *Lamprospora wisconsinensis* was treated as a synonym of *Pulvinula laeterubra* by Pfister (1976). Tai's report of *L. wisconsinensis* was based on two specimens deposited in HMAS (HMAS 17131, 17132) from Yunnan Province. Re-examinations of these collections indicate that the correct name for the fungus is *Pulvinula globifera* (Rifai 1968).

Peziza abietina Pers., Neues Mag. Bot. 1: 113, 1794, sensu Seaver, North American Cup-fungi (Operculates) p. 228, 1928.

= *Otidea abietina* (Pers.) Fuckel, Jahrb. Nassauischen Vereins Naturk. 23–24: 330, 1870, sensu Kanouse, Mycologia 41: 675, 1949.

Chinese records: Teng, Fungi of China p. 291, 1963. Tai, Sylloge Fungorum Sinicorum p. 262, 1979. Wang & Zang, Fungi of Xizang p. 25, 1983.

Notes: For a long time, this name was commonly applied to a species of *Otidea* (Kanouse 1949). As indicated by Nannfeldt (1966) based on his study of authentic material of *Peziza abietina*, it is not a member of *Otidea* but a rough-spored member of *Peziza* Dill. ex Fr.

Teng (1963, 1996) reported "*Peziza abietina*" from Gansu Province as fruitbodies regular to irregular-cupulate, light brown, with a coarse and short stalk, ascospores ellipsoid containing a single large guttule, paraphyses enlarged at the apex. These characters do not fit the genus *Otidea*. Re-examination of the only specimen filed under *P. abietina* from Gansu and identified by S.C. Teng (HMAS 30799) indicates that though the morphology of the fungus is identical with Teng's description of "*Peziza abietina*" it is not a *Peziza* judging from the J– asci in Melzer's reagent. Its gross morphology is like those members of *Helvella* with cupulate fruitbodies, and its ascospores also resemble those of *Helvella* species, though the excipular structure seems to be different from *Helvella*.

The Chinese record of "*Peziza abietina*" by Tai (1979) is based on collections from Heilongjiang, Shanxi and Inner Mongolia on deposit in HMAS (HMAS

33642, 33848, 39243) and Teng's previous report (Teng 1963). Re-examinations of the above three specimens show that they are not *Otidea* species; rather one is *Urnula craterium* (Schwein.) Fr. and two are true *Peziza* species with warts and crests on the ascospores. The two *Peziza* specimens were examined and annotated in 1995 by D.H. Pfister as "*Peziza* sp., not *P. abietina*" for 33848 and "*Peziza* sp." for 39243. According to the ascospore size of both *Peziza* collections from China, they are neither *Otidea abietina* as circumscribed by Fuckel (1870), nor *Otidea abietina* sensu Kanouse (1949), nor even *Peziza abietina* sensu Saccardo (1889)."*Peziza abietina*" was also reported from Bomi, Tibet (Xizang) based a single collection deposited in HKAS (HKAS 5858) (Wang & Zang 1983). Re-examination of the collection indicates that its gross morphology and ascospore size do not fit the concept of *O. abietina* sensu Kanouse, but rather that of *O. alutacea* (Pers.) Massee var. *alutacea* (Kanouse 1949).

Psilopezia deligata (Peck) Seaver, North American Cup-fungi (Operculates) p. 107, 1928.

Chinese record: Wang & Pei, Mycotaxon 79: 311, 2001.

Notes: *Psilopezia deligata* was reported from Dongling Mountains, Beijing (Wang & Pei 2001) based on a single collection (HMAS 74678). Re-examination of the fungus reveals that it represents *P. dabaensis* W.Y. Zhuang (Zhuang 1997). *Psilopezia deligata* differs from the Chinese material in smaller fruitbodies, larger ascospores, and narrower asci (Pfister 1973).

Pulvinula laeterubra (Rehm) Pfister, Occ. Pap. Farlow Herb. Crypt. Bot. 9: 11 (1976).

Chinese record: Wang & Pei, Mycotaxon 79: 311, 2001.

Notes: Wang & Pei (2001) reported this species from China based on collections from Dongling Mountains, Beijing on deposit in HMAS. Both specimens under this name from Dongling Mountains identified by Z. Wang (HMAS 75887, 76048) were re-examined. My observations indicate that they are not *P. laeterubra* but *P. miltina* (Berk.) Rifai as evidenced by presence of the short hair-like hyphae about 2.5 μm diameter covering the receptacle surface (Rifai 1968).

Trichophaea bullata Kanouse, Mycologia 50: 131, 1958.

Chinese record: Wang & Pei, Mycotaxon 79: 312, 2001.

Notes: *Trichophaea bullata* was recorded from Dongling Mountains, Beijing (Wang & Pei 2001) based on a single collection (HMAS 74650). Re-examination of the fungus indicates that its hair base is never swollen to 30–35 μm in diameter as is characteristic of *T. bullata* (Kanouse 1958) and it fits well within the scope of *T. woolhopeia* (Cooke & W. Phillips) Arnould.

Trichophaea pseudogregaria (Rick) Boud., Histoire et Classification des Discomycètes d'Europe p. 60, 1907.

Chinese record: Zhuang, Mycotaxon 79: 378, 2001.

Notes: *Trichophaea pseudogregaria* was recorded from China based on a single collection (HMAS 72821) on deposit in HMAS and so labeled (Zhuang 2001). Re-examination of the specimen shows that *T. gregaria* (Rehm) Boud. is the correct name for the fungus.

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Literature cited

Boudier E. 1905–1910. Icones Mycologicae. 4 volumes. Paris. p 1–221.

Cao JZ, Fan L, Liu B. 1990a. Some species of *Otidea* from China. Mycologia 82: 734–741.

Cao JZ, Fan L, Liu B. 1990b. Notes on the genus *Smardaea* in China. Acta Mycol. Sinica 9: 282–285.

Dennis RWG. 1978. British Ascomycetes. Ed. 2. Vaduz: Cramer. p 1–280.

Harmaja H. 1976. New species and combinations in the genera *Gyromitra*, *Helvella* and *Otidea*. Karstenia 15: 29–32.

Häffner J. 1993. Die Gattung *Aleuria*. Rheinl-Pfäl. PilzJourn. 3(1): 6–59.

Kanouse BB. 1949. Studies in the genus *Otidea*. Mycologia 41: 660–677.

Kanouse BB. 1958. Some species of the genus *Trichophaea*. Mycologia 50: 121–140.

Korf RP. 1973. *Discomycetes* and *Tuberales*. In: Ainsworth GC, Sparrow FK, Sussman AS [eds.] The fungi: an Advanced Treaties. Vol. 4A. New York and London: Academic Press. p 249–319.

Korf RP, Zhuang WY. 1984. The ellipsoid-spored species of *Pulvinula* (*Pezizales*). Mycotaxon 20: 607–616.

Korf RP, Zhuang WY. 1985. Some new species and new records of discomycetes in China. Mycotaxon 22: 483–514.

Korf RP, Zhuang WY. 1987. *Geneosperma* Rifai (*Pezizales*, *Scutellinioideae*) and its folliculate ascospores. Acta Mycol. Sinica Suppl. 1: 90–96.

Kutorga E. 2000. *Pezizales*. Mycota Lithuaniae III 5. Vilnivus: Institutum Botanicae Lithuaniae. p 1–275.

Liu B, Cao JZ. 1987. *Otideopsis yunnanensis* gen. et sp. nov. of *Pezizales* from China and its position in *Pezizales* system. Acta Shanxi Univ. 1987(4): 70–73.

Liu CY, Zhuang WY. 2006. Relationship among some members of the genus *Otidea* (*Pezizales*, *Pyronemataceae*). Fungal Divers. 23: 181–192.

Liu MH. 1991. Two new species of *Pulvinula* from China. Acta Mycol. Sinica 10: 185–189. (in Chinese)

Liu MH, Peng HW. 1996. *Scutellinia sinensis*, a new spherical-spored species of *Scutellinia*. Acta Mycol. Sinica 15: 98–100.

Moravec J. 1972. Operculate discomycetes of the genera *Aleuria* Fuck. and *Melastiza* Boud. from the district of Mlanda Boleslav (Bohemia). Česká Mykol. 26: 74–81.

Moravec J. 1994. *Melastiza* (Boud.) comb. et stat. nov. – a subgenus of the genus *Aleuria* Fuck. emend. nov (*Discomycetes*, *Pezizales*). Czech Mycol. 47: 237–259.

Moravec J. 2005. A world monograph of the genus *Cheilymenia* (*Discomycetes*, *Pezizales*, *Pyronemataceae*). Libri Bot. 21: 1–256.

Nannfeldt JA. 1966. On *Otidea caligata*, *O. indivisa* and *O. platyspora* (*Discomycetes* Operculatae). Ann. Bot. Fenn. 3: 309–318.

Pfister DH. 1973. The psilopezioid fungi. III. The genus *Psilopezia* (*Pezizales*). Amer. J. Bot. 60: 355–365.

Pfister DH. 1976. A synopsis of the genus *Pulvinula*. Occas. Pap. Farlow Herb. Crypt. Bot. 9: 1–19.

Reid A, Pegler DN, Spooner BM. 1981. Annotated list of the fungi of Galapagos Islands. Kew Bull. 35: 847–892.

Rifai MA. 1968. The Australasian *Pezizales* in the herbarium of the Royal Botanic Gardens Kew. Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Tweede Sect. 57(3): 1–295.

Saccardo PA. 1889. Sylloge Fungorum. Vol. 8. Padova. p 1–1143.

Saccardo PA. 1899. Sylloge Fungorum. Vol. 14. Padova. p 1–1316.

Schumacher T. 1990. The genus *Scutellinia* (*Pyronemataceae*). Opera Bot. 101: 1–107.

Seaver FJ. 1928. The North American Cup-fungi (Operculates). New York: Seaver. p 1–284.

Tai FL. 1979. Sylloge Fungorum Sinicorum. Beijing: Science Press. p 1–1527. (in Chinese)

Teng SC. 1934. Notes on discomycetes from China. Sinensia 5: 431–465.

Teng SC. 1939. A Contribution to our Knowledge of the Higher Fungi of China. Yangshuo: National Institute of Zoology and Botany, Academia Sinica. p 1–614.

Teng SC. 1963. Fungi of China. Beijing: Science Press. p 1–808. (in Chinese)

Teng SC [Korf RP, ed]. 1996. Fungi of China. Ithaca: Mycotaxon Ltd. p 1–586.

Thind KS, Waraitch KS. 1971. The *Pezizales* of India – XIV. Proc. Indian Acad. Sci., Sect. B 74(6): 269–276.

Wang Yei Z. 1998. The genera *Scutellinia* and *Geneosperma* (*Discomycetes*, *Pezizales*) in Taiwan. Bull. Natl. Mus. Nat. Sci. 11: 119–128.

Wang Yun Z, Zang M, ed. 1983. Fungi of Xizang. Beijing: Science Press. p 1–226. (in Chinese)

Wang Z, Pei KQ. 2001. Notes on discomycetes in Dongling Mountains (Beijing). Mycotaxon 79: 307–314.

Yang CS, Korf RP. 1985. A monograph of the genus *Tricharina* and of a new segregate genus, *Wilcoxina* (*Pezizales*). Mycotaxon 24: 467–531.

Zang M, ed. 1996. Fungi of the Hengduan Mountains. Beijing: Science Press. p 1–598. (in Chinese)

Zhang BC. 1990. Taxonomic status of *Genabea*, with two new species of *Genea* (*Pezizales*). Mycol. Res. 95: 986–994.

Zhang BC, Yu YN. 1992. Revision of Chinese species of *Geopora* (*Pezizales*). Acta Mycol. Sinica 11: 8–14. (in Chinese)

Zhuang WY. 1994 ["1993"]. Current understanding of the genus *Scutellinia* (*Pezizales*, *Otideaceae*) in China. Mycosystema 6: 13–24.

Zhuang WY. 1997. Fungal flora of the Daba Mountains: Discomycetes. Mycotaxon 61: 3–12.

Zhuang WY, ed. 2001a. Higher Fungi of Tropical China. Ithaca: Mycotaxon Ltd. p 1–485.
Zhuang WY. 2001b. A list of discomycetes in China. Supplement I. Mycotaxon 79: 375–381.
Zhuang WY, ed. 2005. Fungi of Northwestern China. Ithaca: Mycotaxon Ltd. p 1–430.
Zhuang WY. 2006 ["2005"]. Notes on *Otidea* from Xinjiang, China. Mycotaxon 94: 365–370.
Zhuang WY. 2009. The genus *Sowerbyella* (*Pezizales*) in China. Mycotaxon 109: 233–237.
Zhuang WY, Korf RP. 1989. Some new species and new records of discomycetes in China. III. Mycotaxon 35: 297–312.
Zhuang WY, Wang Z. 1998a. Discomycetes of tropical China. I. Collections from Hainan Island. Mycotaxon 67: 21–31.
Zhuang WY, Wang Z. 1998b. Discomycetes of the tropical China. II. Collections from Yunnan. Mycotaxon 69: 339–358.
Zhuang WY, Yang ZL. 2008 ["2007"]. Some pezizalean fungi from alpine areas of southwestern China. Mycol. Montenegrina 10: 235–249.